

LISTING OF THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

Claims 1-23 (Canceled)

24. (New) A pump for delivering precisely determined, small liquid flows comprising:

at least one pump device including a displacement chamber, a piston that is movable in the displacement chamber, the piston having at least a first, foremost seal for sealing the piston against the displacement chamber, the first seal comprising a sealing element with a sealing lip surrounding the piston, the sealing lip having a first surface and a second surface; a spring-elastic element resting on the opposed second surface of the sealing lip for prestressing the first surface of the sealing lip against the piston, the second surface being in contact with the displacement chamber, the sealing element and the spring-elastic element are essentially C-shaped in cross-section; and

a filling body that is essentially incompressible under operating conditions of the pump disposed in the chamber in order to reduce dead space of the pump device resulting from the seal.

25. (New) The pump according to claim 24, wherein the C-shaped profile of the spring element includes a slot having a width essentially equal to a height of the interior of the C, such that the filling body is axially insertable into the spring element and is shaped to substantially fill out the interior of the C at least preponderantly.

26. (New) A pump comprising at least a first and a second pump device each according to the pump of claim 24 and each comprised of a displacement chamber and a piston, the second pump device being downstream of the first pump device and being operatable as a storage device of pulsation of the first pump device.

27. (New) A pump for delivering precisely determined, small liquid flows comprising at least one pump device including a displacement chamber, a piston that is movable in the displacement chamber, the piston having at least a foremost seal for sealing the piston against the displacement chamber, the seal comprising a sealing lip surrounding the piston, the sealing lip having a first surface and a second surface; a spring-elastic element resting on the opposed second surface of the sealing lip for prestressing the first surface of the sealing lip, the second surface being in contact with the displacement chamber;

the spring element is essentially a closed, spring-elastic band having an inner side in contact with the second surface of the sealing lip, and

the displacement chamber has an internal wall located at a small distance from an external surface of the spring element in order to reduce the dead space of the pump device resulting from the seal.

28. (New) The pump according to claim 27, wherein the band comprises a coil of a spring-elastic material wherein turns of the coil are wound around the sealing lip.

29. (New) A pump comprising at least a first and a second pump device each according to claim 27 and each comprised of a displacement chamber and a piston, the second pump device being downstream of the first pump device and being operatable as a storage device of pulsation of the first pump device.

30. (New) A pump for delivering precisely determined, small liquid flows comprising at least one pump device including a displacement chamber, a piston that is movable in the displacement chamber, the pump has a driving unit, a piston rod operatively connecting the piston to the driving unit of the pump;

a piston adjusting device connecting the piston to the piston rod, the piston adjusting device between the piston and the piston rod is adjustable in length in order to be able to adjust the total length of the piston and piston rod assembly to the distance between the driving unit and the bottom of the displacement chamber, and thus to be able to adjust dead space in the chamber.

31. (New) The pump according to claim 30, wherein the piston is mounted on the piston rod in a longitudinally displaceable manner.

32. (New) The pump according to claim 30, wherein the piston adjusting device includes a clamping device allowing to lock the piston in a determined position with respect to the piston rod .

33. (New) The pump according to claim 30, wherein in the piston adjusting device, a spring is disposed between the piston and the piston rod such that a reduction of the total length of an assembly of the piston and the piston rod is effected against the restoring force of the spring element.

34. (New) The pump according to claim 30, wherein the displacement chamber has a bottom in the form of a body of a material that is at the most negligibly compressible under the operating pressure of the pump but sufficiently more elastic than the piston, and that fills out the cross-section of the displacement chamber completely, for allowing the piston to be adjusted to an indefinitely small distance from the bottom of the displacement chamber in the upper dead center without risk of damage of the piston through contact with the bottom of the displacement chamber during the adjusting procedure or in operation.

35. (New) The pump according to claim 30, wherein the piston comprises a bar-shaped piston portion of a mechanically resistant material, and having a rear end mounted in a seat of a sleeve such that the clamping device can be applied against the sleeve substantially punctually, thereby locking the sleeve in the piston rod without a risk of damaging the bar-shaped piston portion by the clamp.

36. (New) A pump comprising at least a first and a second pump device each according to the pump of claim 30 and each comprised of a displacement chamber and a piston, the second

pump device being downstream of the first pump device and being operatable as a storage device of pulsation of the first pump device.

37. (New) A method for adjusting the dead space in a pump for delivering precisely determined, small liquid flows wherein the pump comprises:

at least one pump device including a displacement chamber, a piston that is movable in the displacement chamber, the pump has a driving unit, a piston rod operatively connecting the piston to the driving unit of the pump,

a piston adjusting device connecting the piston to the piston rod, the piston adjusting device between the piston and the piston rod is adjustable in length in order to be able to adjust the total length of the piston and piston rod assembly to the distance between the driving unit and the bottom of the displacement chamber, and thus to be able to adjust dead space in the chamber;

the method comprising moving the piston rod to the upper dead center, advancing the piston into the displacement chamber until the desired dead space results, and locking the piston in the piston rod by actuating a locking device of the piston adjusting device.

38. (New) A pump for delivering precisely determined, small liquid flows comprising

at least one pump device including a displacement chamber, a piston that is movable in the displacement chamber, the displacement chamber has a bottom which essentially comprises a front end of an opposed piston that is displaceable in the displacement chamber such that a dead space of the pump device is adjustable.

39. (New) The pump according to claim 38, wherein the opposed piston includes an adjusting device comprising a position indicator, for making the adjustment of the dead space in the displacement chamber detectable from the outside.

40. (New) A pump comprising at least a first and a second pump device each according to the pump of claim 38 and each comprised of a displacement chamber and a piston, the second pump device being downstream of the first pump device being and operatable as a storage device of pulsation of the first pump device.

41. (New) Application of the pump according claim 38, wherein the opposed piston is adjustable according to an intended operating pressure in order to achieve a reduced pulsation.

42. (New) A pump for delivering precisely determined, small liquid flows under high pressures comprising

at least one pump device including a displacement chamber, a piston that is movable in the displacement chamber;

at least one working medium access bore of the pump device having a detachable connecting assembly including at least one pair of sealing surfaces forming a junction that is tight to a working medium, one sealing surface is essentially dome-shaped and convex and the other sealing surface is essentially concave and conical, and the sealing surfaces have a center with a respective opening of a channel for the working medium defining an annular contact line between the two sealing surfaces even if the channel openings are not precisely aligned to each other.

43. (New) The pump according to claim 42, wherein a seal is interposed between the sealing surfaces of at least one pair of the sealing surfaces.

44. (New) The pump according to claim 42, further comprising at least a first and a second pair of the sealing surfaces, a sealing body is disposed between the first and second pairs of the sealing surfaces, the first and second sealing surfaces including inner surfaces; the sealing body having the respective inner sealing surfaces of the two pairs of sealing surfaces formed thereon and the inner sealing body is comprised of a dimensionally stable, highly pressure-resistant synthetic material.

45. (New) The pump according to claim 42, further comprising at least a first and a third pair of sealing surfaces each including an inner and an external sealing surface, and the two inner sealing surfaces each face the other pair of sealing surfaces, a connecting body disposed between

the external sealing surfaces of the two pairs of sealing surfaces, so that the two pairs of sealing surfaces each form a tight junction with the connecting body.

46. (New) The pump according to claim 42, further comprising a pair of a first and a second contact surface contacting each other, a second connecting body in the connecting assembly on which the first contact surface and the sealing surface are formed, the second connecting body being held between the second contact surface and the other one of the sealing surfaces; a duct for the working medium fixedly connected to the second connecting body wherein the duct communicates with the channel having the opening located in the sealing surface of the second connecting body.

47. (New) The pump according to claim 46, wherein the contact surfaces are cambered and complementary to each other to center the second connecting body in the second contact surface.

48. (New) The pump according to claim 46, wherein in at least one of the first sealing surface pairs at least one of the sealing surfaces is provided with a concentrically stepped surface in order to provide a plurality of sealing lines.

49. (New) A pump comprising at least a first and a second pump device each according to the pump of claim 46 and each comprised of a displacement chamber and a piston, the second pump device being downstream of the first pump device and being operatable as a storage device of pulsation of the first pump device.